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gas, differing in equivalent combinations, according to the peculiar constitution of the plant; and thus the foundation is laid for all that prodigious diversity which characterizes the numberless species of the vegetable creation.

12. "A Comparison of the late Imperial Standard Troy Pound Weight with a Platina copy of the same, and with other Standards of authority." Communicated by Professor Schumacher, in a Letter to Francis Baily, Esq., V.P. and Treas. of the Society.

Professor Schumacher being desirous of procuring an accurate copy of the English Imperial Standard Troy pound weight, for the purpose of comparison with the Danish weights, applied to Capt. Kater, requesting him to cause such copy to be made; which was accordingly done. It was made of brass by Bate; but the result of the weighings not being satisfactory to Professor Schumacher, he desired to have a second copy forwarded to him. As these two copies did not agree in their results, the first was returned to Capt. Kater with a request that he would repeat the weighings. The result confirmed Professor Schumacher's suspicions: and as it was not thought proper that, in an affair of so much importance as the comparison of the standard weights of two nations, any source of discordance should exist, or even be suspected, (the preceding experiments having been made with a *copy* of the Imperial standard weight) the Danish Government sent over Capt. Nehus (of the Royal Danish Engineers) to this country for the express purpose of making comparisons with the *original* standard, in the possession of the Clerk of the House of Commons.

The weighings took place in the Apartments of this Society, and were partly made with Ramsden's balance, belonging to the Society. Besides the first brass weight above mentioned, there was another brass weight made by Robinson, a platina weight made by Cary, the brass pound weight belonging to the Royal Mint, and the platina pound weight belonging to this Society. These were all subjected to a most rigid and accurate series of weighings by Capt. Nehus, in which every precaution was taken to insure the most correct results. It would be impossible here to follow Capt. Nehus through all his details: but it may be sufficient now to state that upwards of 600 comparisons were made with the English Imperial standard, all of which are apparently very accordant; but, on account of a singular circumstance connected with the *original* standard, do not possess that degree of precision, nor afford that satisfaction which ought to attach to an affair of so much importance. For, it appears that not only the specific gravity of the original standard had never been ascertained, but that we are even ignorant of the kind of metal of which it was composed: some persons maintaining that it was of brass, others of copper, and others of bell-metal. And, as the original was totally destroyed in the late fire which consumed the two Houses of Parliament, we cannot now supply this omission. It is well known that the specific gravity of brass may vary from 7.5 to 8.5; so that a difference of at least $\frac{1}{4}$ of

a grain might arise from this circumstance alone ; setting aside a number of other particulars that require minute attention, and which do not seem to have been attended to in former experiments of this kind. In fact, as Professor Schumacher remarks, though we have thus five different pounds in excellent preservation, and compared with the lost standard, with the greatest care and the best instruments, though the number of these comparisons exceeds 600, yet there still remains an uncertainty as to its real weight ; and this solely on account of its specific gravity and expansion not being known. And, he adds, that it is to be hoped that no pound will in future be declared a legal standard unless these elements (the knowledge of which is indispensable even for a single comparison with a good balance) are previously determined with the greatest possible precision.

Besides the account of these numerous weighings, which are stated in detail, Professor Schumacher has given various formulæ and tables which will be found of great use and application in any future experiments of a like kind that may be undertaken.

13. "On the Application of a New Principle in the Construction of Voltaic Batteries, by means of which an equally powerful current may be sustained for any period required ; with a description of a sustaining battery recently exhibited at the Royal Institution." By Frederick W. Mullins, Esq., M.P., F.S.S. Communicated by N. A. Vigors, Esq., F.R.S.

The method resorted to by the Author for obtaining a continuous voltaic current of equal intensity, is the same in principle as the one employed by Professor Daniell, and described by him in his paper recently presented to the Royal Society, and published in the *Philosophical Transactions* ; namely, the interposition of a thin membrane between the two metals in the voltaic circuit, so as to allow of the separation of the different fluids applied respectively to each metal : the fluid in contact with the zinc being a mixture of diluted sulphuric and nitric acids ; and that in contact with the copper being a solution of sulphate of copper. The author reserves for a future paper the details of the results he has obtained, with regard to the relations between the intensity of effect, and the extent and disposition of the metallic surfaces : but states that he has obtained powerful electric action by bringing the membrane into contact with the zinc ; the latter having no acid applied to it, and the only fluid employed being the solution of sulphate of copper.

14. Anonymous Essay, entitled "*Scoperta della Causa Fisica del Moto.*" Presented to the Royal Society, with a view to obtaining one of the Royal Medals for 1836.

The Author commences by an historical review of the opinions of almost every philosopher, both ancient and modern, who has treated of the subject of motion, from Pythagoras to Le Sage : and proceeds to state his own ideas relating to the cause of motion,